

ANNEX P

PUBLIC HEALTH EMERGENCIES; ENVIRONMENTAL ISSUES

I. TYPE OF HAZARD

Public Health Emergencies; Environmental Issues

II. DESCRIPTION OF HAZARD

Public health emergencies can take many forms—disease epidemics, large-scale incidents of food or water contamination, or extended periods without adequate water and sewer services. There can also be harmful exposure to chemical, radiological, or biological agents, and large-scale infestations of disease-carrying insects or rodents. The first part of this section focuses on emerging public health concerns and potential pandemics, while the second part addresses air and water pollution caused by natural or man-induced means.

Public health emergencies can occur as primary events by themselves, or they may be secondary to another disaster or emergency, such as tornado, flood, or hazardous material incident. For more information on those particular incidents, see Annex A (Tornadoes/Severe Thunderstorms), Annex B (Riverine Flooding), and Annex K (Hazardous Materials). The common characteristic of most public health emergencies is that they adversely impact, or have the potential to adversely impact, a large number of people. Public health emergencies can be statewide, regional, or localized in scope and magnitude.

In particular, two public health hazards have recently emerged as issues of great concern, with far reaching consequences. One pertains to the intentional release of a radiological, chemical, or biological agent, as a terrorist act of sabotage to adversely impact a large number of people. For more information on biochemical terrorism (including discussions on potential pandemics and other public health emergencies), see the Annex N of this document. The second hazard concerns a deadly outbreak (other than one caused by an act of terrorism) that could kill or sicken thousands of people across the county or around the globe, as in the case of the Spanish Flu epidemic of 1918-1919.

Whether natural or man-induced, health officials say the threat of a dangerous new strain of influenza virus in pandemic proportions is a very real possibility in the years ahead. Unlike most illnesses, the flu is especially dangerous because it is spread through the air. A classic definition of influenza is a respiratory infection with fever. Each year, flu infects humans and spreads around the globe. There are three types of influenza virus, known as Types A, B, and C. Type A is the most common, most severe, and the primary cause of flu epidemics. Type B cases occur sporadically and sometimes as regional or widespread epidemics. Type C cases are quite rare and hence sporadic, but localized outbreaks have occurred. Fortunately, influenza usually is treatable, and the mortality rate remains low. Each year, scientists estimate which particular strain of flu is likely to spread, and they create a vaccine to combat it. A flu pandemic occurs when the virus suddenly changes or undergoes an “antigenic shift,” permitting it to attach to a person’s respiratory system and leave the body’s immune system defenseless against the invader.

Environmental concerns addressed in this annex focus on air and water pollution, because contamination of those media can have widespread impacts on public health, with devastating consequences. Particular issues of primary concern associated with sources of air and water pollution change over time depending

on recent industrial activity, economic development, enforcement of environmental regulations, new scientific information on adverse health affects of particular contaminants or concentrations, and other factors. Those issues are d detailed in Sections VI and VII of this annex.

III. HISTORICAL STATISTICS

A. Influenza Pandemics

Epidemic influenza, an age-old infectious disease, kills several thousand men and women in the United States every year. Since the early 1900s, three lethal pandemics have swept the globe, although none have compared to the infamous Spanish Flu event of 1918-1919, which killed more than 20 million people. The 1957 Asian Flu and the 1968 Hong Kong Flu also were killers, although they weren't nearly as virulent as the 1918 strain. The 1957 epidemic killed about 70,000 people in the United States, mostly the elderly and chronically ill. Another 34,000 Americans died from the 1968 epidemic. While both of these latter epidemics cost many lives, neither was as severe as the Spanish Flu of 1918, which claimed more than 700,000 lives in the U.S alone. Its primary victims were mostly young, healthy adults. In addition to those three pandemics, several "pandemic scares" have occurred.

1. Spanish Flu of 1918-1919

In 1918, while World War I was in its fourth year, another threat began that would rival the war itself as the greatest killer in human history. The Spanish Flu swept the world in three waves during a 2-year period, beginning in March 1918 with a relatively mild assault. The first reported case occurred at Camp Funston (Fort Riley), Kansas, where 60,000 soldiers trained to be deployed overseas. Within 4 months, the virus traversed the globe, as American soldiers brought the virus to Europe. The first wave sickened thousands of people and caused many deaths (46 died at Camp Funston), but it was considered mild for what was to come. The second and deadliest wave struck in the autumn of 1918 and killed millions. At Camp Funston alone, there were 14,000 cases reported and 861 deaths during the first 3 weeks of October 1918. Outbreaks caused by a new variant exploded almost simultaneously in many locations, including France, Sierra Leone, Boston, and New York City, where more than 20,000 people died that fall. The flu gained its name from Spain, which was one of the hardest hit countries. From there, the flu went through the Middle East and around the world, eventually returning to the U.S. as the troops came home during its second wave. Of the 57,000 Americans who died in World War I, 43,000 died as a result of the Spanish influenza. At one point, more than 10 percent of the American workforce was bedridden. By a conservative estimate, a fifth of the human race suffered the fever and aches of influenza in 1918-1919, leaving 20 million people dead.

In 1918, Missouri's influenza death rate was 293.83 per 100,000 people, for a total of 9,677 deaths statewide from that cause alone. That figure represents 18.6 percent of Missouri's total deaths that year. While the cause of the Spanish Flu remains somewhat a mystery, the epidemic was generally traced to pigs on Midwest farms, which then spread the deadly virus to farm families. As fall crops were ready for harvest in 1918, there were no field hands to get the crops in, thereby creating an agricultural disaster as well. A third wave of the Spanish Flu, much less devastating than its predecessors, made its way through the world in early 1919 and then finally died out.

Missouri's flu death rate in 1919 dropped to less than half that of the previous year (107.21 per 100,000), and by 1921, it was reduced to 87.24 deaths per 100,000 people, state statistics show.

2. Asian Flu of 1957

In February 1957, this flu pandemic was first identified in the Far East. Unlike the Spanish Flu pandemic, the 1957 virus was quickly identified, and vaccine production began in May 1957. A number of small outbreaks occurred in the U.S. during the summer of 1957, with infection rates highest among school children, young adults, and pregnant women; however, the elderly had the highest rates of death. A second wave of infections occurred in early 1968, which is typical of many pandemics.

3. Hong Kong Flu of 1968

In early 1968, this influenza pandemic was first detected in Hong Kong. The first cases in the U.S. were detected in September 1968, although widespread illness did not occur until December. This became the mildest pandemic of the 20th century, with those over the age of 65 being the most likely to die. People with earlier infections by the Asian Flu virus may have developed some immunity against the Hong Kong Flu virus. Also, this pandemic peaked during school holidays in December, limiting student-related infections.

4. Flu Scares: Swine Flu of 1976, Russian Flu of 1977, and Avian Flu of 1997

Three notable flu scares have occurred in the 20th century. In 1976, a swine-type influenza virus appeared in a U.S. military barracks (Fort Dix, New Jersey). Scientists determined it was an antigenically drifted variant of the feared 1918 virus. Fortunately, a pandemic never materialized, although the news media made a significant argument about the need for a Swine Flu vaccine.

In May 1977, influenza viruses in northern China spread rapidly and caused epidemic disease in children and young adults. By January 1978, the virus, subsequently known as the Russian Flu, had spread around the world, including the United States. A vaccine was developed for the virus for the 1978-1979 flu season. Because illness occurred primarily in children, this was not considered a true pandemic.

In March 1997, scores of chickens in Hong Kong's rural New Territories began to die—6,800 on three farms alone. The Avian Flu virus was especially virulent, and made an unusual jump from chickens to humans. At least 18 people were infected, and six died in the outbreak. Chinese authorities acted quickly to exterminate over 1,000,000 chickens and successfully prevented further spread of the disease.

B. Other Diseases Of Public Health Concern

1. Smallpox

Smallpox is a contagious, sometimes fatal, infectious disease. There is no specific treatment for smallpox disease, and the only prevention is vaccination. Smallpox is caused by the variola virus that emerged in human populations thousands of years ago. It

is generally spread by face-to-face contact or by direct contact with infected bodily fluids or contaminated objects (such as bedding or clothing). A person with smallpox is sometimes contagious with onset of fever, but the person becomes most contagious with the onset of rash. The rash typically develops into sores that spread over all parts of the body. The infected person remains contagious until the last smallpox scab is gone. Smallpox outbreaks have occurred periodically for thousands of years, but the disease is now largely eradicated after a worldwide vaccination program was implemented. After the disease was eliminated, routine vaccination among the general public was stopped. The last case of smallpox in the United States was in 1949.

It should be noted that after recent terrorist events in the U.S., there is heightened concern that the variola virus might be used as an agent of bioterrorism. For this reason, the U.S. government is taking precautions for dealing with a smallpox outbreak. For further information on this issue, see the Terrorism section of this report (Section N).

2. St. Louis Encephalitis

In the United States, the leading type of epidemic flaviviral encephalitis is St. Louis encephalitis (SLE), which is transmitted by mosquitoes that become infected by feeding on birds infected with the virus. SLE is the most common mosquito-transmitted pathogen in the U.S. There is no evidence to suggest that the virus can be spread from person to person. Since 1964, there have been 4,437 confirmed cases of SLE, with an average of 193 cases per year. It should be noted, however, that less than 1 percent of SLE infections are clinically apparent, so the vast majority of infections remain undiagnosed. Illnesses range from mild headaches and fever to convulsions, coma, and paralysis. The last major outbreak of SLE occurred in the Midwest from 1974 to 1977, when over 2,500 cases were reported in 35 states. The disease is generally milder in children than in adults, with the elderly at highest risk for severe illness and death. Approximately 5 to 15 percent of cases are fatal; no vaccine against SLE exists.

3. Meningitis

Meningitis is an infection of fluid that surrounds a person's spinal cord and brain. High fever, headache, and stiff neck are common symptoms of meningitis, which can develop between several hours to 1 to 2 days after exposure. Meningitis can be caused by either a viral or bacterial infection; however, a correct diagnosis is critically important, because treatments for the two varieties differ. Meningitis is transmitted through direct contact with respiratory secretions from an infected carrier. Primary risk groups include infants and young children, household contact with patients, and refugees. The disease is of most concern in Africa, where 213,658 cases were reported during 1996-1997, with 21,830 deaths. In the United States, periodic outbreaks continue to occur, particularly among adolescents and young adults. Generally, 10 to 15 percent of cases are fatal, and 10 to 15 percent of those who recover suffer from permanent hearing loss, mental retardation, loss of limbs, or other serious effects. Vaccines have been developed for some strains of meningitis, although some of those vaccines are not routinely used in the United States.

4. Lyme Disease

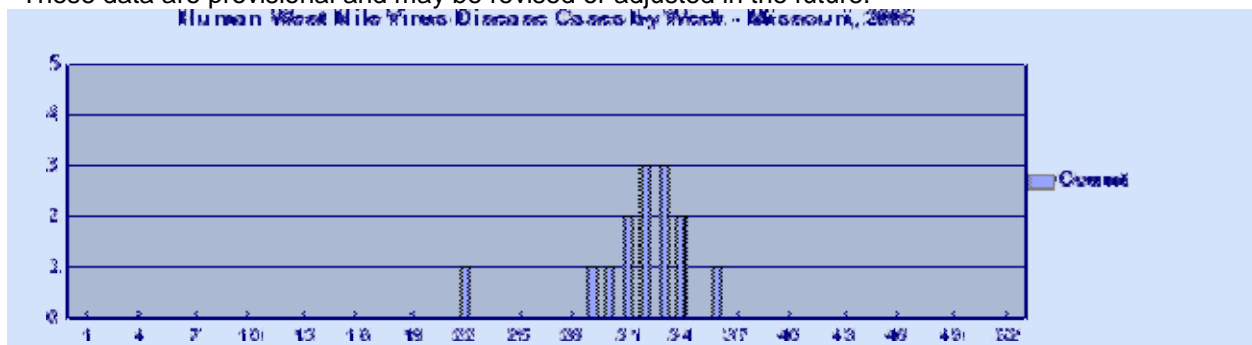
Lyme disease was named after the town of Lyme, Connecticut, where an unusually large frequency of arthritis-like symptoms was observed in children in 1977. It was later found that the problem was caused by bacteria transmitted to humans by infected deer ticks, causing more than 16,000 reported infections in the United States each year (however, the disease is greatly under-reported). Lyme disease bacteria are not transmitted from person to person. Following a tick bite, 80 percent of patients develop a red “bulls-eye” rash, accompanied by tiredness, fever, headache, stiff neck, muscle aches, and joint pain. If untreated, some patients may develop arthritis, neurological abnormalities, and cardiac problems, weeks to months later. Lyme disease is rarely fatal. During early stages of the disease, oral antibiotic treatment is generally effective, while intravenous treatment may be required in more severe cases. In the U.S., Lyme disease is mostly found in the northeastern, mid-Atlantic, and upper north-central regions, and in several counties in northwestern California. In 1999, 16,273 cases of Lyme disease were reported to the Centers for Disease Control and Prevention (CDC). There have been no reported cases of lyme disease that originated in Missouri.

5. West Nile Virus

West Nile virus is a flavivirus spread by infected mosquitoes and is commonly found in Africa, West Asia, and the Middle East. It was first documented in the United States in 1999. Although it is not known where the U.S. virus originated, it most closely resembles strains found in the Middle East. It is closely related to St. Louis encephalitis and can infect humans, birds, mosquitoes, horses, and other mammals. Most people who become infected with West Nile virus will have either no symptoms or only mild effects. However, on rare occasions, the infection can result in severe and sometimes fatal illness. There is no evidence to suggest that the virus can be spread from person to person. An abundance of dead birds in an area may indicate that West Nile virus is circulating between the birds and mosquitoes in that area. Although birds are particularly susceptible to the virus, most infected birds survive. The continued expansion of West Nile virus in the United States indicates that it is permanently established in the Western Hemisphere.

Cumulative 2005 Data as of 3 am, Sep 27, 2005*

*These data are provisional and may be revised or adjusted in the future.



Cumulative Human Disease Cases by County - Missouri, 2005

| | |
|----------------------|---|
| Adair County | 1 |
| Audrain County | 1 |
| Barton County | 1 |
| Jackson County | 1 |
| Jasper County | 1 |
| Pemiscot County | 1 |
| Saint Charles County | 1 |
| Saint Louis City | 3 |
| Saint Louis County | 4 |

6. Severe Acute Respiratory Syndrome (SARS)

Severe acute respiratory syndrome (SARS) is a respiratory illness that has recently been reported in Asia, North America, and Europe. Although the cause of SARS is currently unknown, scientists have detected in SARS patients a previously unrecognized coronavirus that appears to be a likely source of the illness. In general, humans infected with SARS exhibit fevers greater than 100.4 °F, headaches, an overall feeling of discomfort, and body aches. Some people also experience mild respiratory symptoms. After 2 to 7 days, SARS patients may develop a dry cough and have trouble breathing. The primary way that SARS appears to spread is by close person-to-person contact; particularly by an infected person coughing or sneezing contaminated droplets onto another person, with a transfer of those droplets to the victim's eyes, nose, or mouth.

C. Environmental Incidents

For information regarding historical incidents involving air and water pollution in Missouri, see Annex K of this document.

IV. MEASURE OF PROBABILITY AND SEVERITY

Health officials agree there is a high probability we will see another dangerous new strain of the influenza virus sometime in the future. In fact, a worldwide influenza outbreak on the scale and severity of the Spanish Flu is not far-fetched, and is expected by many experts. Should such a killer-virus strike today, the results in Missouri and elsewhere could be catastrophic. Today, a much larger percentage of the world's population is clustered in cities, making them ideal breeding grounds for epidemics. Additionally, the explosive growth in air travel means the virus literally could be spread around the globe within hours. Under such unique conditions, there may be very little warning time. Most experts believe we will have just 1 to 6 months between the time that a dangerous new influenza strain is identified and the time that outbreaks begin to occur in the U.S. Outbreaks are expected to occur simultaneously throughout much of the nation, preventing shifts in human and material resources that normally occur with other natural disasters. These and many other aspects make an influenza pandemic unlike any other public health emergency or community disaster.

Environmental concerns are also on the rise, with recent scientific data emphasizing the long-term impacts that air and water pollution can have on the ecology of the affected areas. With continued enforcement of regulatory standards for airborne releases and discharges to waterways, routine emissions

by industrial facilities are relatively easy to monitor and control. However, the potential always remains for unauthorized dumping and releases, and for failure of systems to control industrial discharges, resulting in potential environmental emergencies.

V. IMPACT OF THE HAZARD

For planning purposes, it is reasonable to assume a rapid movement of a pandemic flu virus from major metropolitan areas to rural areas of the state. The effect of a pandemic on individual communities would likely be relatively prolonged—weeks to months. The impact of the next pandemic could have a devastating effect on the health and well being of Missouri citizens and the American public. For such an outbreak in the future, CDC estimates that in the U.S. alone:

- Up to 200 million persons will be infected.
- Between 40 and 100 million persons will become clinically ill.
- Between 18 and 45 million persons will require outpatient care.
- Between 300,000 and 800,000 persons will be hospitalized.
- Between 88,000 and 300,000 people will die nationwide.
- Effective preventive and therapeutic measures, including vaccines and antiviral agents, likely will be in short supply, as well as some antibiotics to treat secondary infections.
- Based on the CDC's preliminary estimates, economic losses from the next pandemic may range from \$71 to 166 billion, depending on the attack rate.

Compared to public health emergencies, as previously described, environmental incidents involving air and water pollution would likely impact a more localized area; however, long-term effects on the environment in the impacted area could linger for many years.

VI. SYNOPSIS

A. Public Health Emergencies

The Missouri Department of Health and Senior Services (MDHSS) and the State Emergency Management Agency (SEMA) were selected by the CDC and the Council of State and Territorial Epidemiologists (CSTE) to test a national plan for dealing with a catastrophic flu outbreak. MDHSS and SEMA designed an interactive exercise, "FLUEX '98," to test two draft national response documents: (1) Influenza Pandemic Preparedness Action Plan for the United States, and (2) Pandemic Influenza: A Planning Guide for State and Local Officials. These documents were used for the design of FLUEX, and during the exercise itself. FLUEX was held February 4-5, 1998, in the State Emergency Operations Center at SEMA headquarters in Jefferson City, Missouri, and included more than 100 participants. Missouri was the only state in the nation to hold such an exercise, and one of only six states to help test the proposed national plan. Major topics explored during FLUEX included the following:

- Identifying quickly circulating viruses

- Allocating potentially scarce vaccine supplies
- Communicating emergency health information to the public
- Keeping essential public safety services operating during a time of widespread illness among employees.

As a follow-up to that planning event, the Federal Emergency Management Agency (FEMA) conducted a satellite video conference on planning for an influenza pandemic, which was broadcast nationally on February 25, 1999. SEMA, MDHSS, and local health departments hosted sites for the telecast across the state. The videoconference highlighted Missouri's planning efforts to date and featured health officials from Connecticut and Maine. They joined with a special panel at CDC headquarters in Atlanta, including SEMA's exercise officer, to answer a wide range of call-in questions on crisis management for a pandemic.

The sudden and unpredictable emergence of pandemic influenza and its potential for causing severe health, social, and economic consequences strongly requires the need for a comprehensive, action-oriented strategy. Principal goals of the national plan are two-fold: to improve prevention and control of influenza in the U.S. during the present (interpandemic) period, and to identify and implement specific ways and procedures to improve readiness for a future pandemic. As the CDC revises the draft national plan, Missouri will prepare an emergency response plan to deal with an influenza pandemic on the state level. MDHSS emphasizes that Missouri needs to prepare now to deal with challenges that could arise, such as vaccine shortages, widespread illness, and disruption in essential services. This was proven to be a pre-cursor for the bioterrorism planning and exercising that was a result of the anthrax event that occurred in October 2001. Following this event the MDHSS and the LPHAs in Missouri played a significant role in all emergency/disaster preparedness.

B. Environmental Issues

Although Missouri has never had an environmental disaster of large proportions, there are many instances where hazardous substances can impact the environment with considerable consequences to either air or water. Floods often temporarily interrupt community water supplies, creating the need for emergency potable water for thousands of people. In July 1993, for example, St. Joseph's municipal water plant was forced to shut down for an extended period when contaminated floodwater threatened to enter the system. Floodwaters also disrupt wastewater treatment facilities, resulting in the discharge of raw or improperly treated sewage. Periodically, water pollutants cause fish kills in Missouri streams, and excessive air pollutants associated with smog in large metropolitan areas create public health problems.

1. Air Pollution

Air quality in Missouri is monitored at 72 stations throughout the state. These stations are maintained by the U.S. Environmental Protection Agency (EPA), and state and local authorities. These stations can be divided into three separate groups: National Air Monitoring Stations (NAMS), State and Local Air Monitoring Stations (SLAMS), and Special Purpose Monitors (SPM). These monitors measure suspended particulate, ozone, carbon monoxide, sulfur dioxide, nitrogen dioxide, and lead. Lead is of particular interest because Missouri's lead industry produces about 90 percent of the new lead in the nation. The three large lead smelters in Missouri (near Herculaneum) have their own monitoring network operated by the company that runs the smelters. The state monitors

the network to ensure proper function, and all data are forwarded to EPA. EPA maintains a list of facilities that release the most toxic chemicals each year. Missouri's five top facilities for 2000 are shown in Table P-1 in Section VII of this section. The top 10 chemicals released in the state are shown in Table P-2.

Because of high amounts of ozone, carbon dioxide, nitrogen compounds, and other vehicular pollutants in the St. Louis metropolitan area, vehicles registered in the counties of St. Louis, St. Charles, and Jefferson, as well as St. Louis City, are required to have their exhaust systems routinely checked to determine whether emissions standards are being achieved. In addition, all service stations around St. Louis are now required to have new gas nozzles that recapture gasoline vapors, thus preventing them from being released to the atmosphere. These vapors (unburned hydrocarbons) chemically react with nitrogen oxides when exposed to the sunlight and form ozone, which is the basis for smog. For more information on Missouri's Air Pollution Control Program, contact the Missouri Department of Natural Resources.

2. Water Pollution

The Missouri Department of Natural Resources also maintains the state's water quality management plan, and has developed individual plans for each drainage basin in Missouri. Those drainage basins may be divided into the following geographic categories: Upper Mississippi River tributaries, Lower Mississippi River tributaries, Missouri River tributaries north of the Missouri River, Missouri River tributaries south of the Missouri River, White River tributaries, and Arkansas River tributaries.

There are 22,194.2 miles of classified Missouri streams (i.e., permanently flowing streams or streams that maintain permanent pools during dry weather). Of these waters, 48 percent (10,707.3 miles) meet clean water goals for all recognized uses. There are 203.2 miles that are not able to be assessed. The remaining 11,283.7 miles of water do not meet clean water goals for all recognized uses, but only 626.4 miles are considered to have serious water quality problems (i.e., to the point where at least one recognized use of the water body has been lost).

There are 293,319 acres of classified lakes in Missouri. Of that area, 69 percent (202,668 acres) meet clean water goals for all recognized uses. There are 70 acres that are not able to be assessed. The remaining 90,581 acres do not meet clean water goals for all recognized uses, with 46,810 acres considered to have serious water quality problems (i.e., to the point where at least one recognized use of the water body has been lost).

The most recent available water quality report indicates that the most important pollutant related issues in Missouri are as follows:

- Mercury levels in fish appear to be increasing over time.
- Twenty Class I and 380 Class II confined animal feeding operations in Missouri generate large amounts of manure, creating the potential for serious water problems.

- Eutrophication of large, recreationally important reservoirs appears to be increasing, possibly due to increased confined animal production in the watersheds of these lakes.
- Tailings from abandoned lead-zinc mines continue to impact waters long after mining operations have ceased.

The water quality report also identifies several other water quality concerns as follows:

- Channelization has caused aquatic habitat degradation in 17 percent of Missouri's streams, as well as promoted increased water velocities, stream bank erosion, and severity of flooding.
- Additional groundwater protection measures are needed, including a complete groundwater monitoring network and educational programs for those involved in the application of farm chemicals, transporters of hazardous materials, and the general public.
- Continued suburban development impacts streams by loss of stream channels, removal of riparian areas, and activities that result in increased storm water flows.
- Evidence indicates that fish and invertebrate communities in many Missouri streams are suffering from the degraded quality of the aquatic habitat.

For more information on Missouri's Water Pollution Control Program, contact the Missouri Department of Natural Resources at (573) 751-1300.

C. Identifying Pollution Hazard Areas

Local emergency management officials should identify pollution hazard areas so that in case of a natural disaster, recovery steps will not be delayed. Pollution of public drinking water, for example, can cause severe problems with re-entry and recovery. If alternate sources of safe drinking water can be identified, or relocation of water intakes can eliminate polluted drinking water, then recovery can be quicker, and local resources can be used to address other problems.

With the increases in motor vehicle registrations throughout the state, the levels of nitrocarbon emissions will naturally rise. Combinations of smog and carbon monoxide levels will also increase. These pollutants in sufficient quantities can have deleterious effects on the health of thousands of Missourians.

VII. MAPS AND OTHER ATTACHMENTS

<http://westnilemaps.usgs.gov>

<http://www.cdc.gov/ncidod/dvbid/westnile/surv&control05Maps.htm>

http://www.cdc.gov/ncidod/dvbid/westnile/surv&control05Maps_Viremic.htm

Environmental Issues: Attachments to this section include a map of the air monitoring stations in Missouri, (air.boomframe.jsp.htm) the list of the top ten facilities in Missouri with the greatest release of toxic chemicals (Table P-1), and the list of the top 10 chemicals reported to be released in Missouri (Table P-2).

TABLE P-1

TOP TEN FACILITIES IN MISSOURI SHOWING GREATEST RELEASES (2001)
(All figures are in pounds)

| Facility | County | Air | Water | Land | Total* |
|------------------------------------|---------------|------------|--------------|-------------|---------------|
| Doe Run Co. Herculaneum Smelter | Jefferson | 261,169 | 442 | 15,182,450 | 15,444,061 |
| Buick Mine/Mill | Iron | 55,729 | 5,495 | 13,518,560 | 13,579,784 |
| Brushy Creek Mine/Mill | Reynolds | 34,192 | 2,175 | 12,762,208 | 12,798,575 |
| Fletcher Mine/Mill | Reynolds | 37,408 | 1,770 | 11,661,687 | 11,700,865 |
| Doe Run Co. Glover Smelter | Iron | 40,114 | 107 | 9,396,570 | 9,436,791 |
| Ameren Sioux Power Plant | St. Charles | 2,376,500 | 9,470 | 1,557,061 | 3,943,031 |
| Sweetwater Mine/Mill | Reynolds | 12,138 | 520 | 3,845,748 | 3,858,406 |
| Meramec Power Plant | St. Louis | 2,110,525 | 12,186 | 1,580,080 | 3,702,791 |
| Royal Oak Ent., Inc, Ellsinore, MO | Carter | 2,714,500 | 0 | 0 | 2,714,500 |
| Ford Motor Company – Kansas City | Clay | 2,635,667 | 0 | 0 | 2,635,667 |

Notes:

* Total amounts do not include off-site releases (i.e., metals at wastewater treatment plants, disposal-related incidents); Missouri had no releases in 2001 through underground injection.

TABLE P-2

TOP TEN CHEMICALS REPORTED IN MISSOURI (2001)
(All figures are in pounds)

| Chemical | Air | Water | Land | Total* |
|--|------------|--------------|-------------|---------------|
| Zinc Compounds | 469,929 | 15,910 | 31,123,423 | 31,609,262 |
| Lead Compounds | 415,337 | 3,448 | 27,854,543 | 28,273,328 |
| Barium Compounds | 160,735 | 104,257 | 6,791,576 | 7,056,568 |
| Hydrochloric Acid ("acid aerosols" only) | 5,874,476 | 0 | 168,005 | 6,042,481 |
| Methanol | 5,868,430 | 12,713 | 5 | 5,881,148 |
| Copper Compounds | 20,270 | 2,900 | 4,658,137 | 4,681,307 |
| Aluminum (fume or dust) | 15,413 | 255 | 3,280,796 | 3,296,464 |
| Xylene (mixed isomers) | 2,990,415 | 0 | 0 | 2,990,415 |
| Hydrogen Fluoride | 2,464,416 | 0 | 158,300 | 2,622,716 |
| Sulfuric Acid ("acid aerosols" only) | 1,748,549 | 5 | 480,255 | 2,228,809 |

Notes:

* Total amounts do not include off-site releases (i.e., metals at waste water treatment plants, disposal-related incidents).

VIII. BIBLIOGRAPHY

Centers for Disease Control and Prevention (CDC). 1999. Emerging Infectious Diseases. Vol. 5. No. 2. Preparing for Pandemic Influenza, the Need for Enhanced Surveillance. March-April 1999.

CDC. 2002. National Vaccine Program Office. Influenza Pandemic Preparedness Action Plan for the United States: 2002 Update.

CDC. 2003. National Vaccine Program Office. Pandemic Influenza: A Planning Guide for State and Local Officials (Draft 2.1). www.cdc.gov/od/nvpo/pandemicflu.htm.

CDC. 2003. National Vaccine Program Office. Pandemics and Pandemic Scars in the 20th Century. www.cdc.gov/od/nvpo/pandemics/flu3.htm.

CDC. 2003. Division of Vector-Borne Infectious Diseases. Questions and Answers About Lyme Disease. www.cdc.gov/ncidod/dvbid/lyme/qa.htm. Accessed June 11, 2003.

CDC. 2003. Division of Vector-Borne Infectious Diseases. CDC Lyme Disease Home Page. www.cdc.gov/ncidod/dvbid/lyme/index.htm. Accessed June 10, 2003.

CDC. 2003. Division of Vector-Borne Infectious Diseases. CDC Answers Your Questions About St. Louis Encephalitis. www.cdc.gov/ncidod/dvbid/arbor/SLE_QA.htm. Accessed June 10, 2003.

- CDC. 2003. Division of Vector-Borne Infectious Diseases. Information on Arboviral Encephalitides. www.cdc.gov/ncidod/dvbid/arbor/arbdet.htm. Accessed June 10, 2003.
- CDC. 2003. Division of Vector-Borne Infectious Diseases. West Nile Virus – Questions and Answers. www.cdc.gov/ncidod/dvbid/westnile/qa/overview.htm. Accessed June 10, 2003.
- CDC. 2003. Division of Vector-Borne Infectious Diseases. West Nile Virus Basics. www.cdc.gov/ncidod/dvbid/westnile/index.htm. Accessed June 10, 2003.
- CDC. 2003. Division of Bacterial and Mycotic Diseases. Meningococcal Disease – General Information. www.cdc.gov/ncidod/dbmd/diseaseinfo/meningococcal_g. Accessed June 16, 2003.
- CDC. 2003. Division of Bacterial and Mycotic Diseases. Meningococcal Disease – Technical Information. www.cdc.gov/ncidod/dbmd/diseaseinfo/meningococcal_t. Accessed June 16, 2003.
- CDC. 2003. Fact Sheet - Smallpox Overview. www.bt.cdc.gov/agent/smallpox/overview/disease-facts.asp. Accessed June 10, 2003.
- CDC. 2003. Division of Vector-Borne Infectious Diseases. Fact Sheet – Basic Information About SARS. www.cdc.gov/ncidod/sars/factsheet.htm. Accessed June 10, 2003.
- Goodson, Lori. 1998. The Manhattan (Kansas) Mercury. Pandemic. March 1, 1998.
- Infectious Disease News (IDN). 1997. Is Another Influenza Pandemic Coming Soon? May 1997.
- Missouri Department of Natural Resources (MDNR). 1995. Division of Geology and Land Survey. Surface Water Resources of Missouri. Missouri State Water Plan Series. Volume 1. Water Resources Report Number 45.
- Missouri Department of Natural Resources (MDNR). 2003. Environmental Assistance Office. Toxics Release Inventory (2001 data)., July 15, 2003
- Missouri Department of Natural Resources (MDNR). 2002. Water Pollution Control Program. Water Quality Report.
- Missouri Department of Natural Resources (MDNR). 2003. Statewide Network of Air Monitoring Sites. www.dnr.state.mo.us/alpd/esp/aqm/critmap.htm. Accessed June 10, 2003.
- Rekenthaler, Doug. 1999. Disaster Relief Website. Eighty Years Later, Threat of Influenza Pandemic Remains Large. www.disasterrelief.org/Disasters/990222Flu2. March 1999.
- Time Magazine (Time). 1998. Vol. 151. No. 7. The Hong Kong Incident. February 23, 1998.